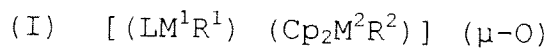


## PATENT CLAIMS

1. A binuclear, oxygen-bridged, bimetallic complex of the general formula I



where:

$M^1$  = Al, Ge, Zr or Ti;

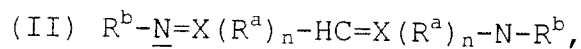
$M^2$  = Zr, Ti, or Hf;

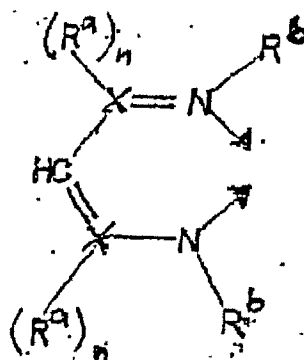
Cp = cyclopentadienyl;

$R^1, R^2$  = H; C(1-6) alkyl; halogen; aryl;  $SiMe_3$  and alkylaryl with aryl =  $C_6H_{5-n}X_n$ , and X = halogen, C(1-6) alkyl, aryl,  $NO_2$ ,  $SO_3H$ ,  $NR^3_2$ , where  $R^3$  = C(1-6) alkyl or H and n = 0 to 5; and

L = a bidentate, doubly heteroatom-coordinated organic chemical ligand, which together with the metal  $M^1$  forms a 5 or 6-membered ring.

2. The bimetallic complex according to Claim 1, characterized in that it is a heterobimetallic complex, preferably where  $M^1$  = aluminum and  $M^2$  = zirconium, more preferably a complex of the form  $[(LAlMe) (Cp_2ZrR^2)] (\mu-O)$ , where  $R^2$  is Me or Cl.
3. The bimetallic complex according to Claim 1 or 2, characterized in that the ligand L has the following composition (formula II):

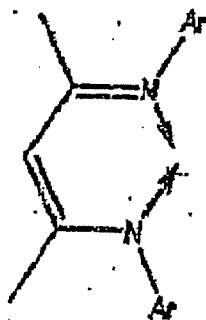
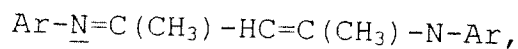




where: X = C or P;

$R^a, R^b = R^1, R^2$ ;  $n = 1$  if  $X = C$ ;  $n = 2$  if  $X = P$ .

4. The bimetallic complex according to Claim 3, characterized in that the ligand L has the following composition:



in particular where  $\text{Ar} = 2,6\text{-iPr}_2\text{C}_6\text{H}_3$ .

5. A method for producing a binuclear, oxygen-bridged, bimetallic complex according to one of Claims 1 through 4, characterized in that a precursor complex of the formula  $\text{LM}^1\text{R}^1(\text{OH})$  is reacted with a metallocene precursor complex  $\text{Cp}_2\text{M}^2(\text{R}^2)_2$  or  $\text{Cp}_2\text{M}^2\text{MER}^2$  or  $\text{Cp}_2\text{M}^2\text{HX}$ , where X = halogen, preferably in an inert solvent.
6. A catalyst preparation for the polymerization of olefins, which contains at least one complex according

to one of Claims 1 through 4 and at least one cocatalyst.

7. The catalyst preparation according to Claim 6, characterized in that the cocatalyst is an alkylaluminumoxane, preferably methylaluminumoxane (MAO).
8. A use of binuclear, oxygen-bridged, bimetallic complexes made of a transition metallocene and an organic aluminum, germanium, zirconium, or titanium compound which does not contain a cyclopentadienyl group, in particular according to one of Claims 1 through 4, as polymerization catalysts.
9. The use according to Claim 8, characterized in that it is at least one heterobimetallic complex.
10. The use according to Claim 8 or 9, characterized in that the catalyst is used in connection with a cocatalyst of the type  $[\text{MeAlO}]_x$ , trialkyl aluminum, or alkylhaloaluminum, in particular with methylaluminumoxane (MAO).

ML/dk